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(54) PACKING BOX PROVIDED WITH VARIABLE PICTURE DISPLAY

(71) We, TOPPAN PRINTING CO., LTD., a company of Japan, of 5-1, Taito 1-chome, Taito-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to a packing box provided with variable picture display.

Printed matter having a lenticular screen bonded to the paper surface imprinted with variable picture elements has been well known in the art as variable picture printing. Such variable picture printings are produced in various ways. In one method, for example, a plurality of original pictures to be displayed are prepared, and these originals are successively photographed at progressively shifted angles of incidence on a light-sensitive film through a lenticular screen. Then, the light-sensitive film is developed to obtain a picture element plate. Then, the picture of the plate is printed on paper, and then a lenticular screen whose cylindrical lens pitch coincides with the span of each printed picture element is bonded with the individual pitches aligned on the printed paper, thereby obtaining the variable picture print.

If such variable picture print is looked in progressively varied directions, the photographs of the originals are progressively viewed due to the lenticulation of the lenticular screen. If the originals are motion picture films for a series of motion, the motion can be viewed by looking the variable picture print through the lenticular screen at progressively varied angles.

An object of the present invention is to provide a packing box of a desired shape provided with a variable picture display.

According to the present invention there is provided a packing box provided with variable picture display, which packing box comprises a carton and a lenticular screen body containing a lenticular screen, the carton being formed from a flat blank hav-

ing at least one surface provided with a variable design pattern which comprises an ordinary pattern portion and at least one variable picture portion containing a plurality of pictures, the ordinary pattern portion being visible as it is through a lenticular screen and one of the pictures contained in the variable picture portion being visible through the lenticular screen, and the lenticular screen body containing the lenticular screen being movable slidably over the variable design pattern, the lenticular screen being formed with a number of cylindrical lenses on the outer side thereof, the inner side in contact with the surface of the packing box being substantially planar, the relationship between the lenticular screen and variable picture portion being such that relative sliding movement of the lenticular screen in relation to the variable picture portion causes different pictures to be seen through the lenticular screen at different positions thereof relative to the said surface. Advantageously, the carton has a side member having a double wall with a gap therebetween, a window being formed in the outer wall of the double wall and a variable picture element portion being printed on the outside surface of the inner wall of the double wall, the lenticular screen being slidably inserted in the gap. In a further advantageous embodiment of the present invention the carton is rectangular and has a variable picture portion printed on at least one of the outer surfaces thereof and wherein the lenticular screen body comprises a rigid lenticular screen of a size capable of being inserted in the carton and of being removed therefrom so as to be able to be slid over the variable picture portion with the flat surface thereagainst.

For a better understanding of the present invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:—

FIGURE 1 shows a plan view of a variable design pattern;

FIGURE 2 shows sectional views illustrat-

ing the relation between the variable design pattern and a lenticular screen;

FIGURE 3 shows a plan view of a picture viewed through the lenticular screen;

5 FIGURE 4 shows a plan view of a flat blank of a carton to be provided with a variable design pattern according to the invention;

10 FIGURE 5 shows a perspective view of the lenticular screen for the carton of Figure 4;

FIGURE 6 shows a perspective view of the packing box;

15 FIGURE 7 shows a plan view of a flat blank of a second embodiment of a carton to be provided with a variable design pattern according to the invention;

20 FIGURE 8 shows a perspective view of the lenticular screen body used in the embodiment of Figure 7;

FIGURE 9 shows a perspective view of the packing box of Figure 7;

25 FIGURE 10 shows a plan view of a flat blank of a third embodiment of a carton to be provided with a variable design pattern according to the invention;

30 FIGURE 11 shows a front view of the lenticular screen body used in the embodiment of Figure 10;

FIGURE 12 shows a cross-sectional view of the packing box of Figure 10;

FIGURE 13 shows a perspective view of the packing box of Figure 10;

35 FIGURE 14 shows a plan view of a flat blank of a fourth embodiment of a carton to be provided with a variable design pattern;

40 FIGURE 15 shows a front view of the lenticular screen body used in the embodiment of Figure 14; and

FIGURE 16 shows a perspective view of the carton of Figure 14 with the lenticular screen body of Figure 15 held in contact therewith.

45 Referring now to the drawings, Figure 1 shows a variable design pattern 1, which consists of an ordinary pattern portion 2 and a variable picture portion 3. The ordinary pattern portion 2 may be a normal photographic picture, illustration, drawing or lettering figure.

50 As shown in Figure 3, if it is looked at through a lenticular screen 5, the ordinary pattern portion 2 (shown in Figure 1) can be clearly seen as it is, although the details are slightly dim due to the lenticulation effect.

60 On the other hand, the variable picture portion 3 is displayed as a picture similar to the ordinary pattern portion 2 only when it is looked at through the lenticular screen 5, whose surface is formed with a row of cylindrical lenses. It consists of picture stripes *a*, *b* and *c*, with a plurality of stripes

(usually 2 to 5 stripes) printed in a predetermined order having a uniform span width *P* equal to the span width of each cylindrical lens 6. The picture element stripes *a*, *b* and *c* have a predetermined order and belong to their individual groups forming respective pictures. 65 70

For example, the picture element stripes *a* in the variable picture portion 3 form a picture of a propeller assuming a vertical position, stripes *b* form a picture of the propeller displaced by 60 degrees, and stripes *c* form a picture of the propeller displaced by further 60 degrees. The number of pictures contained in a variable picture portion 3 is not limited to the aforementioned example and any plural number may be provided. Further, it is possible to provide different numbers of pictures for different portions of the variable picture portion. 75 80

The lenticular screen 5 is slidably fitted on the surface of the carton imprinted with the variable design pattern 1 consisting of the ordinary pattern portion 2 and the variable picture portion 3. With this arrangement, by looking at the pattern through the lenticular screen as shown in Figure 2, with the position of the lenticular screen as in the upper view only the picture element stripes *a* are visible to eye 7 of the observer due to the lenticulation effect. When the lenticular screen is shifted in the direction of the arrow to the position in the lower view, only the picture element stripes *b* are visible. When the screen is further shifted to a further position (not shown), only the picture element stripes *c* can be seen. In this way, as the lenticular screen 5 is moved picture element stripes in different groups selectively and progressively come into sight. Thus, where the picture elements form a picture of a propeller as shown in Figure 1, a motion picture of a moving propeller can be viewed due to an illusion. At this time, the ordinary pattern portion 2 can be seen irrespective of the movement of the lenticular screen 5. As for the types of the variable picture display, it is possible to represent various variable pictures, such as motion of arms and legs and other motion, of course including rotation as mentioned above, and change of colour. 85 90 95 100 105 110 115

In the case of a display of changing colour, picture elements of different colours may be provided (for instance yellow picture elements in the stripe groupe *a*, red picture elements in the group *b* and blue picture elements in the group *c*).

As hereinbefore stated, the invention provides packing boxes capable of providing for various interesting variable picture display effects which can be manufactured by imprinting a suitable outer surface of the carton with a combination of an ordinary still pattern and variable picture element 120 125

for the aforementioned various types of variable picture display.

The picture element stripes for the variable picture display are usually formed horizontally, and the lenticular screen 5 is moved in the direction normal to the stripes to vary the picture. The reason for forming the picture elements horizontally is that the eyes of a man (or woman) are spaced apart a certain distance. Therefore, if the picture elements are formed vertically, elements in a comparatively broad region will be seen, so that a dimmer display of the variable picture would result. However, according to the invention, the picture element stripes are not limited to horizontal ones. The arrangement of the lenticular screen such that it is moved in the direction normal to the picture element stripes is effective in that it is possible to obtain rapid variation of picture with less displacement of the lenticular screen. As the unit span width of the variable picture elements is unusually in the range of from 0.2 to 1.0 mm, one angle of the change of pictures can be carried out with a displacement of 0.2 to 1.0 mm of the lenticular screen in the direction normal to the picture element stripes. For less variation of picture with the same movement of the lenticular screen, the lenticular screen may be moved in a direction at a small angle with respect to the direction of the picture element stripes.

In a variable picture display according to the invention, it is important that the lenticular screen is moved in close contact with the variable design pattern 1, for example the paper piece 4 of the carton. If the contact between the lenticular screen and variable design pattern is insufficient, not only the variable picture display cannot be obtained, but also the ordinary pattern viewed through the lenticular screen is dim. This is because if the lenticular screen is separated from the variable design pattern, it acts as a light scattering plate. This will be readily understood from the fact that when an object is looked through a knurled or otherwise indented glass plate, the object is clearly viewed in the case when it is located close to the glass plate but is dim in the case when it is spaced a considerable distance from the glass plate.

Specific examples of the construction where the lenticular screen is slidably provided in close contact with the carton imprinted with a variable design pattern will now be described.

Figures 4 to 6 show an embodiment of the invention, in which a lenticular screen body having a C-shape (as shown in Fig. 5) slidably fitted on the outer surface of the carton as shown in Figure 6.

A flat blank of a carton 10 in this embodiment consists of four sections 11, 12,

13 and 14 defined by parallel creases, a bonding section 15 joined to the section 14 also through a crease, flaps 16, 17, 18 and 19 joined to opposite edges of the sections 11 and 13, lid sections 20, 21, 22 and 23 and insertion flaps 24, 25, 26 and 27 joined to opposite edges of the sections 12 and 14. The afore-mentioned type of variable design pattern 1 is printed on some of the sections 11 to 14 (chiefly sections 12 and 14).

Figure 5 shows the lenticular screen body 28 of this embodiment. It is formed by folding a flat lenticular screen 5 into a channel-like form. The lenticular screen is made of a thermoplastic resin (the most suitable are mainly hard vinyl chloride resins), so that the lenticular screen body 28 may be formed by folding the usual flat lenticular screen into the C-shape in section as shown in Figure 5 while heating it. The bonding section 15 is bonded to the section 11 thereby to complete the packing box, and then the channel-shaped lenticular screen body 28 is slidably fitted on the carton to complete the final product.

Since the carton is thus slidably with respect to the lenticular screen body 28, by moving the carton relative to the screen body (or vice versa), the position of the variable picture elements printed on the carton may be varied relative to the screen body to obtain variable picture display.

In this embodiment, the lenticular screen body 28 has the roles of preventing the deformation of the carton that might otherwise be caused by external forces and protecting the carton from water and moisture as well as providing the lenticulation effect for obtaining the variable picture display.

Figures 7 to 9 show another embodiment, in which a lenticular screen body is slidably fitted on a reticule-like carton.

The flat blank of the carton in this embodiment consists of four sections 31, 32, 33 and 34 joined side by side via creases, a the section 34, bottom flaps 36, 37, 38 and 39 of known type joined to the lower edges of the sections 31 to 34, hooking flaps 40 and 41 joined to the upper edges of the sections 31 and 33, and grip flaps 44 and 45 formed with grip holes 42 and 43 joined to the upper edges of the sections 32 and 34, as shown in Figure 7.

The afore-mentioned type of variable design pattern 7 is printed on each of the sections 32 and 34.

Figure 8 shows the lenticular screen body 44 of this embodiment. It comprises a strip bonding section 35 joined via a crease to 45 consisting of sections joined side by side via creases substantially having the same width as those of the corresponding sections 31 to 34 of the carton and a bonding section 46 joined via a crease to one end section and a lenticular screen 5 of an adequate

size bonded to the strip 45 on the back of a window formed in the strip.

As can be appreciated from Figure 9, the carton is assembled by bonding section 35 to the section 31 and bonding together the bottom flaps 36 and 37, 38 and 39, respectively. Then, the lenticular screen body 44 is assembled by bonding the bonding section 46 to the other end section of the strip 45, and the lenticular screen body 44 is slidably fitted on the carton 30 to complete the packing box product.

In this embodiment, by moving the lenticular screen body 44 relative to the carton in the vertical direction, the position of the variable picture elements printed on the sections 32 or 24 may be varied relative to the lenticular screen 5 to obtain variable picture display.

Figures 10 to 13 shows a further embodiment, in which a lenticular screen body 68 is slidably fitted between inner and outer walls of a double-wall structure portion of a carton 50.

As shown in Figure 10, the flat blank of the carton 50 in this embodiment consists of sections 51 to 57 joined side by side *via* parallel creases, flaps 58 to 67 joined to the opposite edges of the sections 51 and 53, a bottom section 62 joined to the lower edge of the section 52 which constitutes the outer wall of the double-wall structure, a flap 63 joined to the bottom section 62, a lid section 64 joined to the upper edge of the section 52, a flap 65 joined to the lid section 64.

The outer wall section 52 is formed with a window 66 of a suitable size and a slit 67 is formed along the crease between the outer wall section 52 and the lid section 64. The outer surface of the section 56 which constitutes the inner wall of the double-wall structure is imprinted with the afore-mentioned type of variable design pattern 1.

Figure 11 shows the lenticular screen body 68, which comprises a frame 70 having a window 69 of a suitable size and provided with a knob flap 71 joined *via* a crease to the top of the frame and a lenticular screen 5 bonded to the frame 70 on the back side thereof to close the window.

As shown in Figures 12 and 13, the carton is assembled by bonding the section 51 to the section 55. Then, the lenticular screen body 58 is inserted between the outer wall section 52 and the inner wall section 56, with the knob flap 71 projected to the outside of the carton through the slit 67, thus completing the product.

In this packing box, by vertically moving the knob flap, the position of the variable picture elements printed on the inner wall section 56 may be varied relative to the lenticular screen 5 to obtain variable display of picture.

Figures 14 to 16 show another embodiment, in which a lenticular screen body 96 is removably accommodated within carton 80 so that it may be taken out and moved in contact with the surface of the carton.

As shown in Figure 14, the flat blank of the carton 80 in this embodiment consists of sections 81 to 84 joined side by side *via* parallel creases, a bonding section 85 joined *via* a crease to the section 84, flaps 86 to 89 joined to the upper and lower edges of the sections 81 and 83, a bottom section 90 joined to the lower edge of the section 82, a flap 91 joined to the bottom section 90, side flaps 92 and 93 joined to the opposite sides of the flap 91, a lid section 94 joined to the upper edge of the section 82, and a flap 95 joined to the lid section 94.

The afore-mentioned type of variable design pattern 1 is printed on each of the sections 82 and 84 of the carton 80.

Figure 15 shows the lenticular screen body 96 in this embodiment. It is formed by cutting a hard lenticular screen 5 to the illustrated shape and an adequate size so that it can be accommodated within the carton.

The carton 80 is assembled by bonding the bonding section 85 to the section 81, and then the lenticular screen body 96 is put into the carton together with the packet contents.

To obtain the variable display of the picture, the lenticular screen body 96 is taken out of the carton. It is then moved in contact with the section 82 or 84 of the carton by gripping it with a hand as indicated at 97, whereby the variable picture display can be obtained through the lenticular screen body 96.

As has been described in the foregoing, with the construction according to the invention variable picture display can be obtained by moving the lenticular screen body in contact with the carton provided with an interesting variable design pattern. Thus, the invention is very useful when it is applied to candy packing boxes and cases and the like particularly for children.

Also, a carton provided with variable pattern design is simple in construction and manufacture, so that it can be provided very inexpensively.

Further, good contact between the lenticular screen and carton surface imprinted with the variable design pattern is normally ensured with the slide structure, so that a clear variable picture display can be obtained.

WHAT WE CLAIM IS:—

1. A packing box provided with variable picture display, which packing box comprises a carton and a lenticular screen body containing a lenticular screen, the

carton being formed from a flat blank having at least one surface provided with a variable design pattern which comprises an ordinary pattern portion and at least one variable picture portion containing a plurality of pictures, the ordinary pattern portion being visible as it is through a lenticular screen and one of the pictures contained in the variable picture portion being visible through the lenticular screen, and the lenticular screen body containing the lenticular screen being movable slidably over the variable design pattern, the lenticular screen being formed with a number of cylindrical lenses on the outer side thereof, the inner side in contact with the surface of the packing box being substantially planar, the relationship between the lenticular screen and variable picture portion being such that relative sliding movement of the lenticular screen in relation to the variable picture portion causes different pictures to be seen through the lenticular screen at different positions thereof relative to the said surface.

2. A packing box according to Claim 1, wherein the carton is rectangular and is printed with at least one variable picture portion on one of the four side surfaces thereof, the lenticular screen being made of thermoplastic resin, being C-shaped in cross-section for sliding with the inner surface touching the printed variable picture portion and the surfaces of the four sides of the carton, and having the carton inserted therein.

3. A packing box according to Claim 1, wherein the carton is rectangular and wherein the lenticular screen body comprises an annular strip-like member surrounding the carton and formed with a window facing the said surface of the carton and a lenticular screen plate bonded to the strip-like member to close the window, the annular strip-like member being slidably fitted on the carton such that the aforesaid relationship between the lenticular screen and variable picture element to produce variable picture display is maintained.

4. A packing box according to Claim 1, wherein the carton has a side member hav-

ing a double wall with a gap therebetween, a window being formed in the outer wall of the double wall and a variable picture element being printed on the outside surface of the inner wall of the double wall, the lenticular screen being slidably inserted in the gap.

5. A packing box according to Claim 1, wherein the carton is rectangular and has a variable picture portion printed on at least one of the outer surfaces thereof and wherein the lenticular screen body comprises a rigid lenticular screen of a size capable of being inserted in the carton and of being removed therefrom so as to be able to be slid over the variable picture portion with the flat surface thereagainst.

6. A packing box in accordance with Claim 1, substantially as hereinbefore described with reference to Figures 1 to 3 of the accompanying drawings.

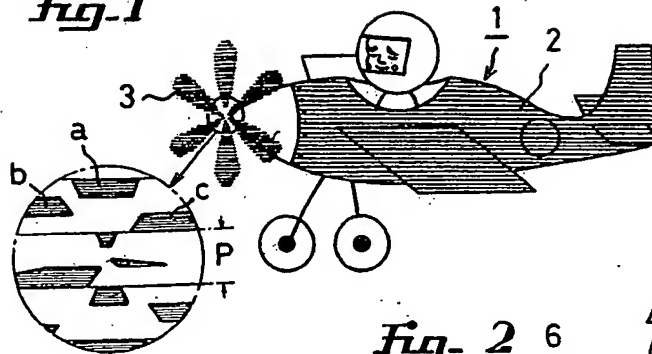
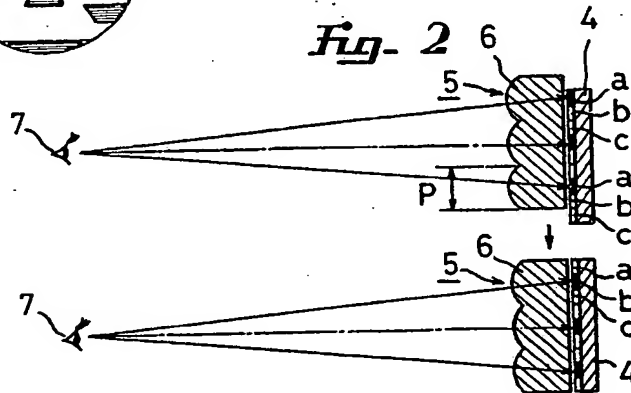
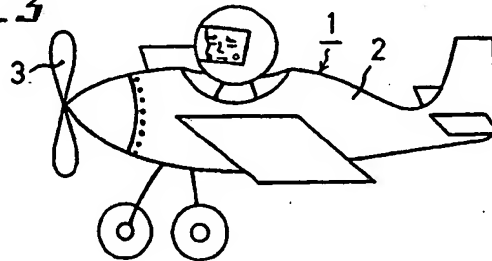
7. A packing box, substantially as hereinbefore described with reference to, and as shown in, Figures 4 to 6 of the accompanying drawings.

8. A packing box, substantially as hereinbefore described with reference to, and as shown in, Figures 7 to 9 of the accompanying drawings.

9. A packing box, substantially as hereinbefore described with reference to, and as shown in, Figures 10 to 13 of the accompanying drawings.

10. A packing box, substantially as hereinbefore described with reference to, and as shown in, Figures 14 to 16 of the accompanying drawings.

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Fig-1*Fig-2**Fig-3*

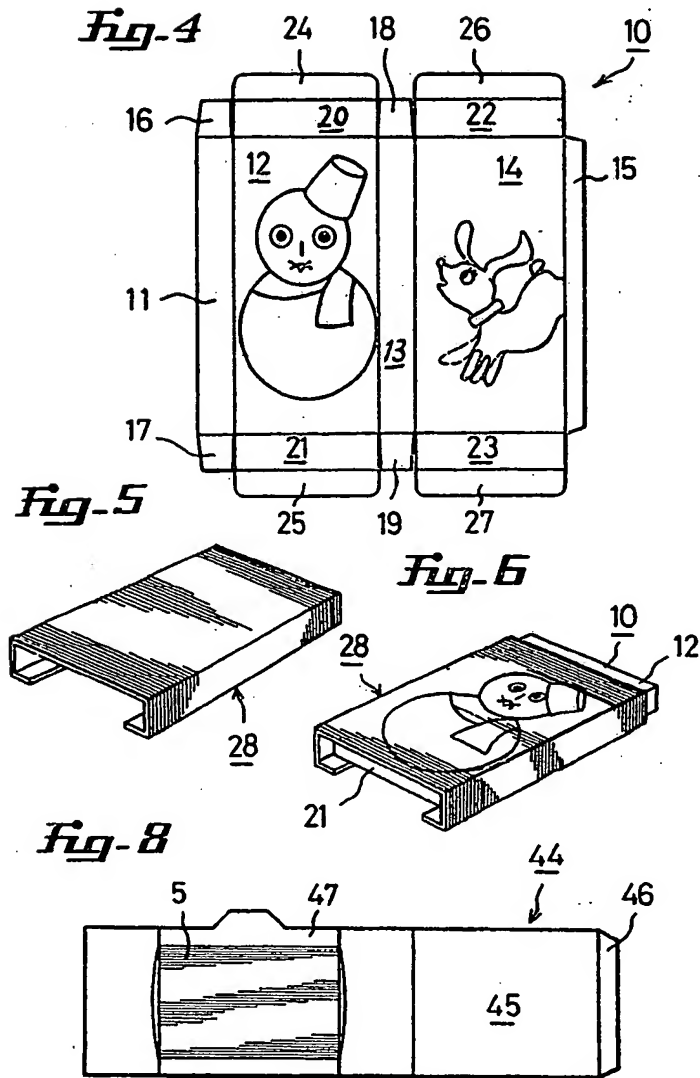


Fig-7

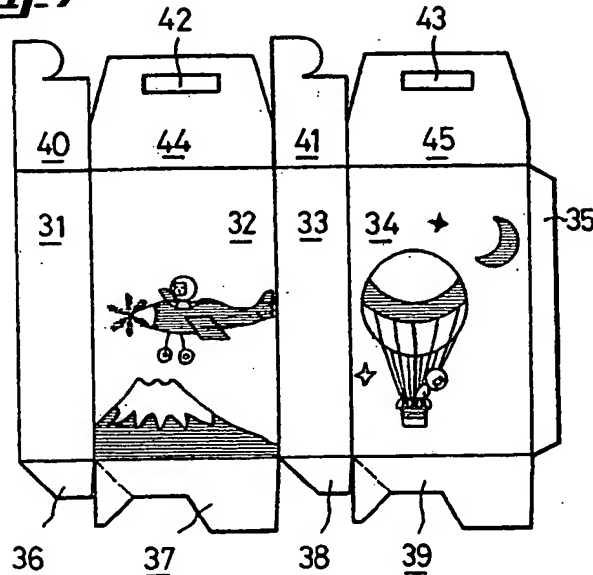


Fig-12

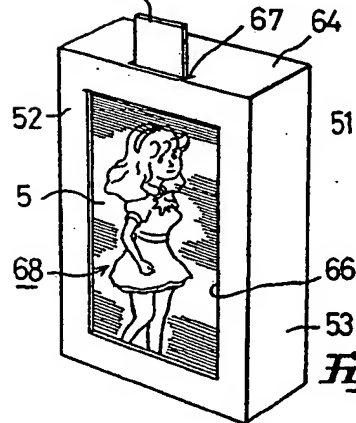
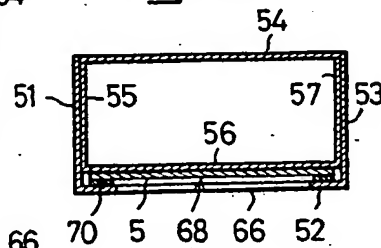


Fig-13

